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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,050	12/19/2001	Marvin M. Johnson		5944

7590

04/23/2003

RICHMOND, HITCHCOOK, FISH & DOLLAR  
P.O. Box 2443  
Bartlesville, OK 74005

EXAMINER

NORTON, NADINE GEORGIANNA

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 04/23/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/025,050

Applicant(s)

JOHNSON ET AL.

Examiner

Nadine Norton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

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### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language; or

Claims 1, 14-21, and 35 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sughrue et al.(6,254,766).

Applicants are claiming several processes for the desulfurization of middle distillates. Applicants' processes involve co-feeding a sulfur containing middle distillate and a hydrogen containing diluent to a reaction zone under conditions sufficient to vaporize the sulfur containing middle distillate. Applicants' processes further include the step of contacting the vaporized middle distillate with a sorbent comprising a promoter metal and zinc oxide. Applicants' dependant claims contain limitations directed at specific process conditions, promoter metals, and feeds.

The reference of Sughrue et al.(6,254,766) discloses a desulfurization process which employs a sorbent composition. See abstract, lines 1-4. The sorbent composition contains zinc oxide, reduced nickel and an aluminate. See column 5, lines 44-55 and 65-68, and column 16, lines 45-46. Sughrue et al.(6,254,766) teaches that suitable process feeds include a diesel fuel

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boiling in the range of 300-750°F. See column 3, lines 51-58. Reaction conditions include the feed being in a gaseous state, a temperature of 100-1000°F (preferably 400-800°F), a feed rate of

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0.5 to 50 WHSV, the pressure of hydrogen, and a pressure of 15-1500 psia (50-500 psia). See column 4, lines 1-4 and column 7, lines 25-55 and column 8, lines 1-3. The amount of sulfur in the initial feed ranges from 100 ppm to 10,000 ppm and the amount of sulfur in the final treated product is less than 100 ppm. See column 8, lines 42-45. The reference further teaches that the sorbent is regenerated in an oxygen environment and activated in reducing environment. See column 9, lines 5-45.

The reference of Sughrue et al.(6,254,766) succeeds in disclosing a process with a step corresponding to applicants' hydrogen diluent feed contacting step in the presence of a metal promoted zinc oxide. The reference's disclosure of a diesel feed is considered to meet applicants' middle distillate limitation because it boils in the same range as applicants' middle distillate. In addition, applicants' more than 50% sulfur reduction is considered to be encompassed by the reference of Sughrue et al.(6,254,766) because it discloses the reduction of sulfur in a feed from up to 1000 ppm to less than 100 ppm. Also, the production of applicants' sulfide would inherently occur because the same process conditions exist that are responsible for producing applicants' claimed zinc sulfide.

Applicants' process is anticipated by the reference of Sughrue et al.(6,254,766) because the reference discloses essentially the same hydrogen diluent and metal promoted zinc oxide vapor feed contacting step claimed by applicants.

Applicants' zinc sulfide and specifically claimed desulfuization percentages would obviously be provided upon accomplishing the process of Sughrue et al.(6,254,766).

*Claim Rejections - 35 USC § 103*

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2-13, 22-34, and 36-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sughrue et al.(6,254,766).

See teachings of Sughrue et al.(6,254,766) above.

Several differences are noted between the reference of Sughrue et al.(6,254,766) and applicants' claimed invention. The reference of Sughrue et al.(6,254,766) is silent about the specific hydrogen diluent addition rate (e.g. applicants' specific SCFB). Also, the reference is silent about the API gravity and flash point of the feed.

It would have been obvious to one of ordinary skill in the art at the time the invention was made practicing the invention of Sughrue et al.(6,254,766) to add hydrogen at any rate needed to accomplish a desirable conversion, including the specific amounts claimed by applicants, because it has been held that there is no invention were the difference in proportions is not critical and was ascertained by routine experimentation because the determination of

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workable ranges is not considered to be inventive. *In re Swain and Adams*, 70 USPQ 412 (CCPA 1946).

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Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to process a sulfur containing feed with any API gravity or flash point according to the process of Sughrue et al.(6,254,766) because such properties do not appear to restrict the removal of present sulfur.

***Claim Rejections - 35 USC § 103***

Claims 1-5, 7-18, 24-31 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khare (5,281,445) in view of Masuda et al.(6,042,798).

The reference of Khare (5,281,445) discloses a process for removing hydrogen sulfide from any suitable fluid stream. See column 1, lines 5-15 and column 2, lines 55-59. The process involves contacting the contaminated stream with a composition containing zinc oxide and a metal such as nickel. See column 3, lines 10-35 and column 4, lines 31-41. The reference of Khare (5,281,445) discloses process temperatures including 150-600°C and a pressure of atmospheric to 2,000 psig. See column 7, lines 25-65. The feedstream is in the gaseous state. See column 7, lines 59-61. The composition of Khare (5,281,445) is regenerated in an oxygen containing environment. See column 8, lines 9-25.

The reference of Khare (5,281,445) succeeds in disclosing a desulfurization process involving the use of a composition with components corresponding to those claimed by applicants.

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The reference of Masuda et al.(6,042,798) is cited to illustrate that the amount of hydrogen added during desulfurization processes is dependent on the type and quantity of sulfur in specific materials to be treated. See column 4, lines 60-64.

Several differences are noted between the reference of Khare (5,281,445) and applicants' claimed invention. It is noted that the reference of Khare (5,281,445) is silent about applicants' specifically claimed feed, hydrogen amount, and percent desulfurization.

Since middle distillates (including applicants' specific middle distillates such as diesel) are known to contain hydrogen sulfide, it would have been obvious to one of ordinary skill in the art at the time the invention was made to treat a middle distillate containing any amount of sulfur according to the process of Khare et al.(5,281,445) because the reference of Khare et al.(5,281,445) teaches that "any" feed containing hydrogen sulfide is suitable for treatment according to the disclosed process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select any amount of hydrogen needed to effectively accomplish the desulfurization of Khare (5,281,445), including the specific amounts defined in applicants' depending claims, because the reference of Masuda et al.(6,042,798) illustrates that it is within the level of ordinary skill in the art to select a hydrogen amount which is dependent on the amount and type of hydrogen from a feed. In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made that a similar percentage desulfurization occurs because similar conditions are employed to those known to accomplish desulfurization.

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***Prior Art of Record***

The prior art made of record and not relied upon is considered pertinent to applicants'

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disclosure. The attached references are cited to illustrate the relative state of the art with respect to the hydrodesulfurization process employing zinc oxide compositions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Norton whose telephone number is 703-305-2667. The examiner can normally be reached on Monday through Thursday from 8:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

N.N.

March 12, 2003

**NADINE G. NORTON  
PRIMARY EXAMINER**

*Nadine Norton*